GOES-RSTU Mechanical Systems SOW for MIST Contract Task 086 Mod-06

Performance Period: February 01, 2019 to January 31, 2020
Job Order Number (JON):   WBS: 610764.02.04.01.E519.01
ATR: **REDACTED**   **REDACTED**   **REDACTED**

__Summary of the changes in this SOW/Revision/Task modification:__
Extend Task to support GOES-TU from February 01, 2019 thru January 31, 2020.
Same level of support.
Task support includes the GOES-U Observatory.
Mechanical Engineering support to the Thermal Engineer in support of efforts to resolve on-orbit thermal issues

STATEMENT OF WORK:

The purpose of this task is to provide comprehensive mechanical systems supports, configuration management supports, thermal engineering supports, and the requirements management supports to the GOES-RSTU Project. The contractor shall provide senior level Mechanical Systems engineers to support the mechanical design, analysis, limited fabrication, and integration and testing of the GOES-RSTU spacecraft and instruments as required or directed by the Task ATR or by the GOES-RSTU Project. 50% of task will be supporting integration service for the GOES-RSTU Spacecraft & Instruments at the Prime Contractor facilities.

The contractor shall also support the failure investigations and other Technical Interchange Meetings as directed by the ATR. The contractor shall also support the design reviews, Program Status Reviews, Code 543 Branch Status Reviews, the 540 Mechanical Systems Division Technical Status Reviews, Project Technical and Programmatic meetings, outreach activities, and other reviews and information campaign as required by the GOES-RSTU Project and the Mechanical Engineering Branch or directed by the ATR. The Contractor shall provide documents, analysis, drawings, graphics, and material necessary for these meetings and activities.

The Contractor shall provide Configuration Management (CM) support for the GOES-RSTU Project. Scope of the CM includes but not limited to providing CM to Mechanical Systems Engineering for development, implementation, operation and maintenance of a CM system to identify, provide change control, maintain and store flight hardware documents including drawings containing mechanical requirements for the GOES - U Flight hardware. Change control of these documents shall be provided through a CM supported Project Engineering Change Review Board (ECRB) of which Mechanical Systems Engineering is a member of and a formal Configuration Control Board (CCB).

PERFORMANCE SPECIFICATIONS:

Reports and Documentation: Technical performance will be based on thoroughness and completeness of written reports. Acceptable performance is that the ATR is satisfied that the material reflects the proper level of technical expertise and meets the objectives of the activity.

Technical Progress Report: Acceptable progress is that the ATR is satisfied that he is kept informed of the status of work performed and of issues requiring his attention.

Management: Performance will be measured against the following metrics:
- (1) accomplishment of objectives
- (2) clear, incremental progress
- (3) responsiveness to issues
- (4) efficient and appropriate staffing
- (5) coordination with and good working relationship with ATR, Project, and other Contractors.

MILESTONES/DELIVERABLES AND DATES:
Milestone #1:
REVIEW & ASSESS DESIGN and ANALYSIS OF SPACECRAFT/INSTRUMENT HARDWARE: Review the design and analysis results of spacecraft and instrument hardware from the Project Contractors, Universities, and Secondary Contractors. Make independent assessment plan, and conduct assessments as directed by the GOES project or the ATR. Contractor must inform the ATR if the major requests come directly from the Project Office. Present planned major reviews and assessment technical meetings are listed below.
- CCOR Critical Design Review
- CCOR Test Readiness Review
- CCOR Pre Ship Review
- GLM (LM Palo Alto) Test Readiness Review
- GLM (LM Palo Alto) Instrument Pre Ship Review
- EXIS (LASP) Instrument Pre Ship Review
- SUVI (LM Palo Alto) Instrument Pre Ship Review
- SEISS Instrument Pre Ship Review
- ABI (Harris) Instrument Pre Ship Review
- Spacecraft Core Module Integration at Denver Technical Meeting
- SC System Module Integration Technical Meeting
- GOES-TU Observatory Sine-Acoustic-Shock Environmental Test

Deliverable Date: Assessment plan, independent assessment results, assessment of prime contractor results shall be submitted to NASA – GSFC at the COB, 30 days after the completion. Interim Reports and TIMs as indicated in the Assessment Plan.

Milestone #2:
SPACECRAFT AND INSTRUMENTS MECHANICAL TEST: Technical Assessment
Report for all major subsystems (Solar Array, Antenna, Deployment Systems,
Instruments, sine, random, acoustic, shock, modal survey, mechanism life test, etc.) tests.
Major planned tests for the performance service period are listed below.

- GLM Instrument FM4 Vibration Test.
- CCOR Vibration Test
- GOES-TU Pre-Environmental Deployments
- GOES-TU Spacecraft Vibration and Acoustic Test
- GOES-TU Spacecraft Post Environmental Test Deployments

D**eliverable Date:** Assessment Reports shall be completed and submitted to NASA at the
COB, 30 days after the test completion.

Milestone #3:
STATUS & PROGRESS REPORTS via email and or telephone to ATR and to the GOES
Project

Deliverable Date: Monthly Progress Report
                           Bi-Weekly Status Report on Program Critical Issues

Milestone #4:
Technical Status Review (TSR): Conduct the GOES-RSTU Technical Status Review to
the Mechanical Systems Division as requested by ATR

Deliverable Date: Bimonthly

Milestone #5:
Branch Status Review (BSR): Conduct the GOES-RSTU Branch Technical &
Programmatic Status Review to the Mechanical Engineering Branch as requested by
ATR

Deliverable Date: Bimonthly

Milestone #6:
Review spacecraft and instrument CDRL items as required by ATR or the GOES Projects

Deliverable Date: GOES-RSTU Mission Project Schedule due date or ATR specified
date (15 days after receiving the CDRL).

Milestone #7:

Fabricate Hardware to support the GOES-RSTU Mission Development as required.

Deliverable Date: Hardware delivery shall be delivered to support the GOES Mission and Instrument Test Schedule.

Milestone #8: Support Observatory STOP analyses, jitter analyses, and other special mechanical analysis to support the development of the GOES-RSTU Mission as required by Systems Engineering.

Deliverable Date: 1. Per Project Milestones for various cycle
                             2. 30 days after receiving the data files.

Milestone #9: Support the preparation and closure of RFAs, NCR, ECN, etc. for both the spacecraft and Instruments.

Deliverable Date: The closure dates of RFAs, NCR, ECN, etc. are as defined by the Review Team/Project or 30 days after receiving the RFAs.

Milestone #10: Part A: Prepare observatory CLA reduced Craig-Bampton model and LTMs along with transmittal memo as requested by Project or ATR.

Part B: Post process CLA results to update dynamic environments for observatory, spacecraft, instruments and components as required to define or to verify design and test specifications.

Deliverable Date: 1. Part A: Per Project Milestones
                             2. Part B: Due 1 months following receipt of CLA results.

Milestone #11: Perform Vibro-acoustic analysis to simulate random flight events and qualification tests (including model correlation and updating test levels, where possible).

Deliverable Date: 15 days after completion of the Analysis.

Milestone #12: Design, develop, and deliver documents, data package, graphic, and produce materials to support project reviews, outreach activities, and integration, test, & launch campaigns.

Deliverable Date: 30 days after receiving data and information of each activity

Milestone #14: Monitor the design and development of the spacecraft and instrument MGSE.

Deliverable Date: Weekly progress report via email to the Project and the ATR

Milestone #15: Travel to Prime Contractor Facilities, & other as directed by the GOES-RSTU Project or by the ATR to support meetings, data review, testing, etc. Estimate for travel is 2 trips per month.

Deliverable Date: Provide ATR the meeting highlights/summary via phone mail and/or email format 5 days after completion of trip.

Milestone #16: A senior Mechanical Systems Engineer to perform the duties of the Project Resident at the Harris Facility.

Deliverable Date: Daily and Weekly status reports, Technical Reports, recommendations, material information, etc. as requested by Project.

Milestone #17: Place Documents into the library serve as a single, configured, point-of-reference for requirements for the Mechanical Systems Engineering team and for the GOES-RSTU Project.

Deliverable Date: 1 day after the completion of the Signature Cycle of the document or sooner as requested by Project Office or ATR.

Milestone #18: Implementing of the approved changes into the requirement documents. Coordinates the changes in the Project Contracts, and release the changes to the flight hardware contractors.

Deliverable Date: Updated documents completed and delivered to the GOES-RSTU Hardware Contracting Officer or ATR. GOES-RSTU Project Development milestones define delivery dates.

Milestone #19: Developing, establishing, and updating procedures & guidelines for the uses of the CM System. These procedures and guidelines shall support training of the CM System users.

Deliverable Date: Per GOES-RSTU milestones, or 15 days after request from the GOES Project Office or ATR.

<u>Appendix [Summary of Task Modification History]:</u>

Summary of the changes in this SOW/Revision/Task modification Rev-01 July 11, 2016:

1. *Add additional Requirements Management Supports to the GOES-RSTU*
2. *Additional Level of supports:*

    a. **REDACTED**

    b. **REDACTED**

3. *Specific Performance:*

    a. *Coordination with the CM officer to maintain synchronization of the DOORS database and document CM systems.*

    b. *Provide Requirements Management support including coordination, generation and review of verification reports, waiver/deviation review/processing, requirements changes and other documentation changes as directed.*

    c. *Provide DOORS Requirements application support including requirements input, tracking and application maintenance.*

    d. *Customization of the database for project-unique functions related to requirements tracking and verification.*

    e. *Provide technical consultation related to the software products including attending technical discussions and reviews.*

    f. *Organize and lead a periodic user-group meeting to provide information on requirements tool usage and processes, address tool and process related problems, and other requirements-related topics.*

    g. *Support and provide requirement traceability and linking analysis between requirements.*

    h. *Coordinate all requirement management system upgrades or maintenance on a regular basis and on an ad-hoc basis with the server support team.*

        i. *Develop requirements scripting, report generation and associated requirements management backbone capabilities as needed*

Summary of the changes in this SOW/Revision/Task modification on 02/01/2016:

1. *New Task on MIST Contract to support the GOES-RSTU Spacecraft Series development*
2. *Key tasks:*

    a. *GOES-R Final I&T Phase, Avionic Replacements and Regression Test, Launch Vehicle CLA assessment, Pre-shipping & shipping activities, Launch Site Operations, Launch Operations, and the On-Orbit Early Check-out and Test Activities.*

    b. *GOES-S Observatory Integration Phase*

    c. *GOES-ST Instrument Manufacturing, Assembly, Test Verifications, & Integration & Test at the Observatory level*

3. *The Contractor provides the On-orbit sustaining engineering supports for the GOES-RSTU series and previous GOES spacecraft series as directed*

Summary of the changes in this SOW/Revision/Task modification on 02/01/2019:

1. *Task modification on MIST Contract to support the GOES-RSTU Spacecraft Series development*
   a. *Change of ATR*
   b. *Same level of support*
   c. *Reduce scope to GOES-R & S for possible post launch anomaly issue resolution*
2. *Key tasks:*